An Investigation into Barriers to the Adoption of E-Procurement within Selected SMEs in Saudi Arabia

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Abstract: This paper investigates the potential barriers to e-procurement adoption in Saudi Arabian SMEs. The study builds its theoretical foundation on Gunasekaran and Ngai's (2009) model of e-procurement adoption in SMEs on the south-east coast of the USA, which it applies to the Saudi Arabian SMEs to determine their barriers to the adoption of e-procurement. Data was collected from a number of staff from four selected Saudi Arabian SMEs using both qualitative and quantitative tools. This study looks at a number of barriers and analyses their relative importance using hierarchical analytic process.

Key words: e-commerce; e-procurement adoption; barriers; SMEs

JEL codes: M

1. Introduction

Developments in information technology have changed the way businesses operate around the globe and continue to affect them in various ways. Information technology has increased businesses' opportunities to extend their customer base and increase their revenue and competence. However, it has also given rise to challenges, particularly for SMEs, which inherently have fewer resources and face the challenges of being overrun by bigger firms (Gnyawali, 2009). Barriers to e-procurement adoption include lack of technical knowledge and skills, lack of capital, lack of technical tools and lack of highly skilled people. Similarly, people's resistance to change and lack of cooperation and commitment from top management are other barriers to e-procurement adoption.

2. Gunasekaran and Ngai Model: A Theoretical Framework

The adoption of e-procurement in Saudi Arabian SMEs faces many challenges and barriers (Alshehri et al., 2012). One difficulty is the lack of knowledge and awareness about e-procurement and its effects on firms' performance (Abdallah & Albadri, 2010). A theoretical framework for the adoption of e-procurement used by Gunasekaran and Ngai (2008) in Hong Kong and also on SMEs on the south coast of Massachusetts in USA (2009) will be applied to selected Saudi Arabian SMEs. From the literature, it is evident that the framework highlights the benefits and importance of e-procurement issues that might arise and the critical factors for the success of e-procurement, which include communication systems, financial systems, top management support, security

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systems and company priorities. Through an extensive literature research, the study identifies issues specific to SMEs and will help owners and managers in their decisions about e-procurement adoption.
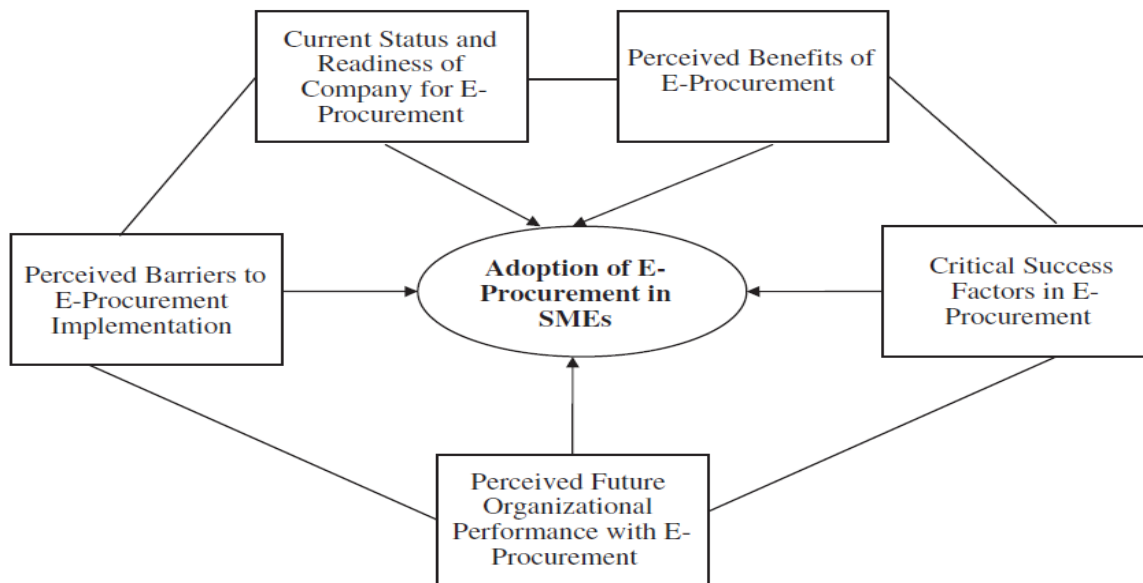

Figure 1 Work Flow in Adoption of E-procurement in SMEs
Source: Gunasekaran & Ngai, 2009

3. Literature Review

Some key barriers to e-procurement adoption have been identified by Hawking et al. (2004):

- Lack of procurement on suppliers' side
- Security of transactions
- Cost and nature of technology
- Lack of technical brain and knowledge
- Lack of legislation
- Lack of business relationship with suppliers
- Lack of standards for data exchange

Liao et al. (2003) investigated and highlighted some infrastructural and behavioural barriers to the adoption of e-procurement. They highlighted behavioural barriers that included the purchasing party getting favour from the supplier, information leaks and false floor prices, and their infrastructural barriers included lack of technology and the expertise required to run such processes.

The following key barriers are discussed widely in literature

3.1 Technology

One could argue that issues arising from the adoption of e-procurement are not totally external; however, because the system is developed, deployed and sometimes even maintained by external users, at least for some initial period until the organization's human resources are equipped with the required skills to maintain it, we categorize it as an external factor. If the e-procurement developing firm or vendor is not co-operating and not giving the required assistance to the SMEs, it constitutes a barrier. Stockdale and Standing (2004) found that vendors or developers sometime ask for a fee that is beyond the capacity of SMEs or that understanding and using

the new software is beyond the skills and abilities of the human resources that the organization possesses. Also vendors and developers mostly target bigger companies, as they can offer big money. Tan et al. (2009) and Chan and Lee (2003) noted that the strength and usefulness of the new system itself determines whether the SMEs should adopt it or not. One major concern with any software solution is its security (Ongori & Migiro, 2010).

3.2 Legislation and Infrastructure

Inadequacies and inconsistency in government rules and legislation greatly affect the adoption of ICT in organizations (Ongori & Migiro, 2010; Karjalainen & Kemppainen, 2008). For example, the government legislation sometimes only allows the interested parties to bid for a tender in person or to provide printed documents about the tender, which can be a big hindrance to e-tendering, one key element of the e-procurement process. Similarly, infrastructure, which is mostly laid and supported by the government, is a key element for the successful adoption of any ICT process, including e-procurement: for example, a fast and high bandwidth broadband solution is a pre-requisite for any ICT system (Karjalainen & Kemppainen, 2008). If some areas are not covered by such facilities, this will be a big setback for government efforts to facilitate wider use of ICT tools (Karjalainen & Kemppainen, 2008). Similarly, vendors' use of different standards can result in incompatibility between two systems when they want to communicate with each other or conduct business. All these issues need to be resolved so that there is no misunderstanding between the vendors and the organization and to overcome any potential problems for the users of the system.

3.3 Management and Organizational Characteristics

The organization and its management play a key role in businesses' adoption of ICT tools such as e-procurement. Characteristics such as larger firm size, both in terms of the number of employees and the financial capital, business type and the organization's involvement in international trade or any association or partnership with firms doing global business are believed to be favourable factors for the organization's adoption of e-procurement. Similarly, management or managerial features such as company polices and codes of conduct, the structure of the organization, use of a quality assurance system, the attitude of the decision-maker (usually the owner) and the owner's perception of ICT tools and supply chain integration are all considered important factors in e-procurement adoption (Johnson, 2010; Karjalainen & Kemppainen, 2008; Zheng et al., 2004).

3.4 Lack of Knowledge

Lack of technical knowledge, along with limited realization and appreciation of the benefits of e-technology, is an important difficulty or barrier for SMEs. Mehrtens et al. (2001) identified it as an important factor for organizational readiness which poses a great hindrance in accessing quality and affordable service from different sources. IT experts and consultants are found to be too expensive for SMEs, especially when they have to be outsourced. Such incoherencies will pose great barriers to the adoption of e-procurement in the absence of sufficient knowledge until there are some strong drivers for adoption.

4. Methodology

This study aims to investigate factors affecting the adoption of e-procurement in Saudi Arabian SMEs using the Gunasekaran and Ngai (2009) model. The use of and replication of an existing model in a different perspective is in line with Ketokivi and Choi (2014) who have stated that generalized empirical context of theory can be elaborated via theory testing and theory building. Ketokivi and Choi (2014) have further stated that using existing theory in a similar logical ground is significant in resolving theory with the new empirical context. From Ketokivi

and Choi (2014) stated that new elements or concepts can be added to the existing theory based on the empirical data as it is directed by an existing tested theoretical consideration. This research is based on theory elaboration case research mode where a general theory of GN (2009) is contextualized to Saudi Arabian SMEs context. The research elaborates the existing logic because the context (Adoption of e-procurement in Saudi Arabian SMEs is not well known to deduce testable hypothesis as per Ketokivi and Choi (2014). Also from Ketokivi and Choi (2014) and Ketokivi (2006), the approach is ideal for exploring new context in more latitude and depth. The researcher followed a triangulation approach where both quantitative and qualitative data were collected from 31 (management and staff) within four selected SMEs to effectively answer the "how" and "what" questions of the research. A combination of questionnaires and interviews were used to implement the strategy and approach. Semi-structured interview questions and a questionnaire were prepared after detailed research and brain storming to provide an insight into various aspects of e-procurement adoption in selected Saudi Arabian SMEs. Analytic Hierarchy Process (AHP) was used to analyze quantitative data and generate statistics based on the data obtained via questionnaires. AHP is pivotal in determining the relative importance of various factors so that due importance can be given to those factors in the adoption of e-procurement. Qualitative data obtained via in-depth interviews and case studies were used for analysis helped to provide an insight into various aspects of Saudi Arabian SMEs and the factors that will be important for their adoption of e-procurement. It is most likely that addressing the factors determined via interviews will increase the probability of successful adoption of e-procurement in selected Saudi Arabian SMEs.

4.1 Justification of Sample Size (Four Selected SMEs)

In a research it is impractical if not impossible to collect data from all target population therefore, a sample is selected in such a way that all possible characteristics of the population can be found in it. In this case the four selected SMEs were carefully chosen, Ahmed Bemrouf (Saudi Suzuki) is a franchise of Suzuki and operating in Riyadh, it deals directly with Suzuki for cars and parts and also with Saudi Customers so have knowledge of dealing with foreign suppliers, financially sound and have adopted some innovative technology. Similarly KA (Khatib Alami) operates across Saudi Arabia and sometime in neighbouring countries, providing range of services and is financially very sound having skilled expatriates as well as some local workers. The other two companies (Al-Maram and Al-Al-Amazon) are small with less finances and smaller business scope. So the sample have a variety of SMEs with different business types, industry, organization culture, workforce and management and to the best of researcher knowledge represents the best possible sample with characteristics that can be representative of all SMEs.

5. Data Analysis and Findings of Quantitative Data Using AHP

Participants' responses on Perceived Barriers were noted and analyzed using AHP. It will be further subdivided into interconnected categories, each of which has factors or elements that affect the overall adoption of e-procurement, as per the Gunasekaran and Ngai (2009) model. The categories and elements and the factors, along with their coding, are as follows:

- Lack of knowledge and skills (LKS)
- Lack of appropriate infrastructure and legislation (LIL)
- Top management attitude and lack of resources (TMALR)
- Lack of trust (LOT)

- Lack of financial resources (LFR)
- Lack of interest or support from government (LISFG)
- Fear of change to a new system (FCINS)
- Immaturity of technology (IOT)
- Incompatibility with current ERP system (ICS)
- Insufficient financial support (IFS)
- Security concerns (SC)
- Cost of implementation (COI)

5.1 Case 1 — Saudi Suzuki

Analysis of data on perceived barriers from Saudi Suzuki reveals that lack of appropriate infrastructure is the biggest barrier to the adoption of e-procurement. Government's lack of Interest in supporting SMEs is the second biggest barrier, according to the responses of participants from Saudi Suzuki, while security issues and concerns are ranked third. Lack of knowledge and skills, immaturity of technology in the country and issues of incompatibility between existing IT software and infrastructure and e-procurement solutions were ranked fifth, sixth and seventh respectively. Remaining barriers and their rankings are shown in Table 1. The average consistency ratio of 8.34% suggests that responses are consistent.

Table 1   Important Elements of BR (Saudi Suzuki)

Participants	LKS	LAI	TMS	LT	LFR	LISG	FCN	IT	IES	IFS	SC	CI	CR
HC1	10.80%	17.40%	2.60%	5.70%	4.60%	15.60%	7.50%	8.30%	8.00%	3.80%	12.30%	3.30%	**7.60%**
DAC1	9.70%	20.30%	5.80%	6.40%	3.20%	11.90%	7.50%	7.90%	7.90%	5.90%	9.80%	3.80%	**9.10%**
MAC1	10.30%	18.90%	3.20%	5.60%	3.50%	13.30%	6.40%	9.80%	8.60%	4.40%	11.40%	4.50%	**9.20%**
HPC1	11.10%	16.70%	2.90%	5.10%	3.60%	13.70%	6.70%	10.90%	8.60%	4.50%	11.70%	4.50%	**8.60%**
MPC1	11.00%	14.90%	2.60%	4.90%	3.80%	14.60%	6.60%	9.20%	9.00%	5.50%	12.90%	5.20%	**9.10%**
SMC1	9.70%	16.60%	3.30%	5.50%	3.50%	14.80%	6.40%	8.80%	8.40%	5.40%	12.30%	5.20%	**8.80%**
HITC1	10.10%	16.40%	2.50%	5.10%	3.00%	15.00%	6.50%	9.60%	9.30%	4.70%	13.10%	4.60%	**9.60%**
S1ITC1	7.70%	15.70%	3.00%	5.50%	3.20%	16.70%	6.60%	9.40%	9.40%	4.80%	14.30%	4.20%	**7.70%**
S2ITC1	8.50%	15.70%	3.00%	5.60%	3.30%	16.70%	5.60%	8.70%	8.80%	5.20%	14.40%	4.60%	**7.50%**
HHRC1	10.00%	15.90%	3.00%	5.70%	3.30%	16.80%	5.90%	8.20%	7.20%	5.20%	13.90%	4.80%	**6.90%**
Average	9.97%	16.90%	3.14%	5.53%	3.60%	14.97%	6.65%	9.01%	8.47%	4.84%	12.58%	4.36%	**8.34%**
Rank	**4**	**1**	**12**	**8**	**11**	**2**	**7**	**5**	**6**	**9**	**3**	**10**	

5.2 Case 2 — KA (Khatib & Alami)

The analysis of data obtained from KA suggests that Government lack of interest in supporting SMEs in various different ways is the biggest barrier to their adoption of e-procurement, unlike Saudi Suzuki, where infrastructure was ranked the biggest barrier. Herein KA, infrastructure is ranked the 2nd biggest barrier. Security concerns, immaturity of technology, lack of knowledge and skills and lack of trust are the third, fourth, fifth and sixth biggest barriers respectively. The remaining barriers and their ranking are shown in Table 2. The average CR of 8.47 suggests that responses on perceived barriers are consistent.

5.3 Case 3 — Al-Maram

Analysis of data obtained from Al-Maram respondents reveals that Lack of financial resources is one of the biggest barriers for the SME adoption of e-procurement which is obvious because Al-Maram is a very small

company with limited finances. Further, the analysis reveals that the respondents are critical of the lack of government interest in supporting SMEs and consider it the second biggest hurdle in the adoption of e-procurement. Lack of knowledge and skills, cost of implementation, security concerns, lack of appropriate infrastructure and lack of trust were found to be the third, fourth, fifth, sixth and seventh biggest perceived barriers to the adoption of e-procurement, respectively. The ranking of other factors in the barrier category is shown in Table 3. The consistency ratio of 8.88 shows that responses on perceived barriers are consistent as per Saaty (1980).

Table 2   Important Elements of BR (KA)

Participants	LKS	LAI	TMS	LT	LFR	LISG	FCN	IT	IES	IFS	SC	CI	CR
HC2	9.50%	13.70%	3.00%	5.90%	3.30%	19.30%	5.00%	10.10%	6.80%	7.70%	10.60%	5.10%	**9.30%**
HPC2	9.80%	14.00%	3.10%	6.00%	3.50%	18.60%	4.70%	11.10%	7.00%	7.20%	10.20%	4.80%	**7.90%**
SPC2	9.90%	17.20%	3.40%	9.70%	4.30%	13.40%	4.20%	8.60%	6.60%	6.00%	11.60%	5.00%	**8.50%**
HFC2	9.30%	13.50%	3.40%	9.00%	4.30%	16.20%	4.00%	11.30%	6.40%	6.10%	11.50%	5.20%	**9.10%**
DHRC2	9.70%	15.90%	3.50%	8.90%	4.30%	12.80%	4.60%	10.50%	6.40%	5.60%	12.30%	5.50%	**8.80%**
HMC2	8.60%	14.10%	3.50%	6.90%	4.30%	16.50%	5.00%	10.40%	6.10%	7.00%	12.00%	5.60%	**8.90%**
SMC2	9.80%	14.40%	3.80%	7.50%	4.50%	14.40%	4.60%	10.20%	6.70%	7.90%	10.30%	5.90%	**7.00%**
HITC2	9.70%	15.40%	3.70%	8.10%	4.40%	12.70%	4.70%	10.10%	6.70%	7.80%	11.30%	5.50%	**7.80%**
S1ITC2	9.80%	13.50%	4.00%	9.80%	4.30%	15.10%	4.50%	10.40%	6.10%	7.10%	10.10%	5.30%	**8.30%**
S2ITC2	9.60%	13.50%	4.10%	9.40%	4.00%	15.70%	4.80%	9.90%	5.90%	7.40%	10.40%	5.30%	**9.10%**
Average	9.57%	14.52%	3.55%	8.12%	4.12%	15.47%	4.61%	10.26%	6.47%	6.98%	11.03%	5.32%	**8.47%**
Rank	5	2	12	6	11	1	10	4	8	7	3	9	

Table 3   Important Elements of BR (Al-Maram)

Participants	**LKS**	**LAI**	**TMS**	**LT**	**LFR**	**LISG**	**FCN**	**IT**	**IES**	**IFS**	**SC**	**CI**	CR
HC3	12.30%	7.40%	3.20%	7.20%	16.40%	13.50%	3.60%	6.10%	4.10%	6.80%	10.30%	9.20%	**9.00%**
PMC3	11.20%	8.50%	3.20%	7.00%	15.60%	14.20%	3.90%	6.30%	4.60%	6.70%	10.90%	7.90%	**9.70%**
HMC3	11.70%	8.20%	3.20%	7.60%	14.20%	13.50%	3.80%	6.30%	4.60%	7.10%	8.80%	11.00%	**9.9%**
AMC3	11.60%	7.60%	3.70%	7.10%	14.60%	12.90%	4.40%	7.40%	4.80%	7.40%	8.30%	10.00%	**7.90%**
DHRC3	12.60%	7.90%	3.50%	7.70%	15.90%	13.60%	3.60%	5.80%	3.90%	7.20%	8.10%	10.20%	**9.60%**
SMC3	12.90%	7.70%	3.50%	6.70%	15.60%	13.80%	3.80%	5.30%	4.10%	6.60%	9.10%	10.90%	**8.10%**
Average	12.09%	7.81%	3.36%	7.21%	15.53%	13.57%	3.81%	6.19%	4.31%	6.94%	9.40%	9.77%	**8.88%**
Rank	3	6	12	7	1	2	11	9	10	8	5	4	

5.4 Case 4 — Al-Amazon

Analysis of respondents' data from Al-Amazon shows that lack of financial resources, lack of government interest and cost of implementation are the first, second and third biggest barriers in the adoption of e-procurement. Ranking of the remaining barriers is shown in Table 4. The responses are consistent, as depicted by the average consistency ratio of 8.95%.

5.5 Overall Average Priority of Perceived Barriers across All SMEs and Consistency Rate (CR)

Lack of government interest to provide assistance and support to SMEs was one of the biggest barriers to the adoption of e-procurement across all four selected SMEs. Lack of infrastructure and lack of knowledge and skills were the second and third biggest barriers to the adoption of e-procurement. Security concerns regarding technology still exist in the minds of people in the SMEs and are therefore ranked as the fourth biggest barrier to

the adoption of e-procurement. The priority of other factors in the perceived barriers category is shown in Table 5. The consistency ratio of 8.66 depicts the consistency of responses on perceived barriers within selected Saudi Arabian SMEs.

Table 4   Important Elements of BR (AL-Amazon)

Participants	LKS	LAI	TMS	LT	LFR	LISG	FCN	IT	IES	IFS	SC	CI	CR
HC4	12.70%	7.70%	3.00%	6.30%	16.10%	13.70%	3.60%	5.10%	3.90%	6.00%	9.50%	12.40%	9.00%
PSC4	12.60%	7.50%	3.00%	6.20%	14.20%	15.70%	3.80%	5.10%	3.90%	5.60%	9.80%	12.70%	9.50%
MSC4	11.40%	8.40%	3.00%	6.00%	15.50%	14.90%	3.50%	4.60%	3.70%	5.50%	10.00%	13.40%	9.60%
AMC4	11.60%	8.50%	3.00%	6.00%	15.80%	13.50%	3.40%	4.50%	3.80%	5.60%	10.10%	14.40%	8.50%
SMC4	12.50%	9.20%	3.30%	7.00%	15.80%	13.50%	3.40%	4.60%	4.10%	5.80%	9.90%	10.90%	8.10%
Average	12.25%	8.17%	3.05%	6.30%	15.58%	14.17%	3.55%	4.83%	3.88%	5.75%	9.80%	12.70%	8.95%
Rank	4	6	12	7	1	2	11	9	10	8	5	3	

Table 5   Overall Average Priority of Perceived Barriers Across all SMEs and Consistency Rate (CR)

Factors	Suzuki	KA	ALMARAM	Al-Amazon	Average	Rank
Lack of knowledge and skills	9.97%	9.57%	12.09%	12.25%	10.97%	3
Lack of appropriate infrastructure	16.90%	14.52%	7.81%	8.17%	11.85%	2
Top management attitude	3.14%	3.55%	3.36%	3.05%	3.28%	12
Lack of trust	5.53%	8.12%	7.21%	6.30%	6.79%	8
Lack of financial resources	3.60%	4.12%	15.53%	15.58%	9.71%	5
Lack of interest or support from Government	14.97%	15.47%	13.57%	14.17%	14.55%	1
Fear of change into a new system	6.65%	4.61%	3.81%	3.55%	4.66%	11
Immaturity of technology	9.01%	10.26%	6.19%	4.83%	7.57%	7
Incompatibility with ERP Systems	8.47%	6.47%	4.31%	3.88%	5.78%	10
Insufficient financial support	4.84%	6.98%	6.94%	5.75%	6.13%	9
Security concerns	12.58%	11.03%	9.40%	9.80%	10.70%	4
Cost of Implement	4.36%	5.32%	9.77%	12.70%	8.04%	6
CR	8.34%	8.47%	8.88%	8.95%	8.66%	

6. Case Studies

6.1 Within-Case Studies

These analyses will be used to investigate the way in which e-procurement is used within the selected SMEs as well as to gain insight into the five factors of the Gunasekran and Ngai (2009), along with external factors as an additional element in these SMEs. Company one (Ahmed Bamarouf Automotive) is a medium-sized company that has relatively good infrastructure and e-procurement tools; company two (Khatib&Alami) is also a medium-sized company, while company three (Al-Maram) and company four (Al-Amazon) are small companies. The cases are developed from quantitative data obtained via questionnaires and qualitative data obtained via semi-structured interviews.

6.1.1 Case 1: Ahmed Bemarouf (Saudi Suzuki)

On perceived barriers of e-procurement in Ahmed Bemarouf (Saudi Suzuki), the analysis of quantitative data obtained via questionnaires regarding fourteen elements as shown in Table 6 below.

Table 6   Perceived Barriers to E-procurement Adoption in Saudi Suzuki

Factors	Average	Rank	Consistency ratio (CR)
Lack of Knowledge and Skills	9.97%	4	
Lack of appropriate infrastructure	16.90%	1	
Top Management attitude	3.14%	12	
Lack of trust	5.53%	8	
Lack of Financial resources	3.60%	11	
Lack of interest or support from Government	14.97%	2	8.34%
Fear to change into a new system	6.65%	7	
Immaturity of Technology	9.01%	5	
Incompatibility with ERP Systems	8.47%	6	
Insufficient financial support	4.84%	9	
Security concerns	12.58%	3	
Cost of Implement	4.36%	10	

It is evident that high ranked barriers such as lack of appropriate infrastructure, lack of Government support, security concerns etc., with a percentage priority ratio of 16.90%, 14.97%, 12.58% respectively, are external, and the internal barriers, such as cost to implement and top management attitude, with average percentage priority of 4.36% and 3.14% respectively, are ranked lower. This means that the company is willing to adopt and has the ability and capability to run the system once the external barriers are overcome.

Further, from the participants' interview statements; it is also evident that they have great awareness about the perceived barriers within the company and also those imposed by external factors. They mentioned quite a few barriers and believed that some of them are extremely important and will inhibit the SME's the adoption of e-procurement if they are not overcome. At the same time, they were hopeful that the scenario would change in the near future to make e-procurement adoption a reality. For example, the head of Saudi Suzuki, while discussing the infrastructural weaknesses, particularly mentioned the slow speed of the internet:

"The internet is very slow and needs further improvement to meet the needs of e-procurement."

This is consistent with the findings reported in the literature, where lack of strong and reliable infrastructure is strongly emphasized as a barrier to the adoption of e-procurement. For example, Laryea and lbem (2014), in their study in South Africa, found that 46% of participants rated this as one of the biggest barriers to the adoption of e-procurement.

If weaker infrastructure is a barrier, then obviously if people have no access at all to IT infrastructure, they will be unable to adopt e-procurement. The study reveals that there are still areas where people do not have access to the internet and other IT infrastructure that is important for the adoption of e-procurement, as the head of Saudi Suzoki explains:

"The infrastructure, including the availability and speed of internet, regulatory framework, e-payments and the availability of IT skilled staff in the country, is at preliminary stage and must be improved to fulfil the needs of e-procurement and other e-commerce solutions."

6.1.2 Case 2: KA

With regard to perceived barriers to e-procurement in K&A, the analysis of quantitative data obtained via questionnaires regarding fourteen elements as shown in Table 7 below.

Table 7   Perceived Barriers to E-procurement Adoption in K&A

Factors	Average	Rank	Consistency ratio (CR)
Lack of Knowledge and Skills	9.57%	5	
Lack of appropriate infrastructure	14.52%	2	
Top Management attitude	3.55%	12	
Lack of trust	8.12%	6	
Lack of Financial resources	4.12%	11	
Lack of interest or support from Government	15.47%	1	
Fear to change into a new system	4.61%	10	8.47%
Immaturity of Technology	10.26%	4	
Incompatibility with ERP Systems	6.47%	8	
Insufficient financial support	6.98%	7	
Security concerns	11.03%	3	
Cost of Implement	5.32%	9	

It is evident that high ranked barriers such as lack of Government support, lack of appropriate infrastructure and security concerns, with an average priority of 15.47%, 14.52% and 11.03% respectively, are external barriers, and the internal barriers such as cost of implementation and top management attitude, with an average priority of 5.32% and 3.55% respectively, are ranked lower, which means that the company is willing to adopt and has the ability and capability to run the system once the external barriers are overcome. The importance of the other factors with empirical evidence is shown in Table 7. The consistency ratio of 8.47% confirms that responses were consistent.

Further, from participants' interview statements; it is also evident that they have great awareness about the perceived barriers within the company and also those imposed by external factors. They mentioned quite a few barriers and believed that some of them are extremely important and that failure to overcome them will inhibit the SME's adoption of e-procurement. At the same time, they are hopeful that the scenario will change in the near future to make e-procurement adoption a reality.

The interview statements of various participants highlighted these barriers in detail. They show that government support is one of the key factors that affect SMEs' adoption of e-procurement is Saudi Arabia. SMEs require government support initiatives for financial, technical and technological development. This can be confirmed by the interview statements of most of the respondents:

For example, the head of KA

> "Saudi Arabia, financers and commerce banks avoid lending to SMEs, which is evident from the fact that the debt capital for SMEs is less than 2% of the country."

The government has also failed to provide cheap training institutes where technical and managerial skills can be imparted to the SMEs' workforce. The head of accounting of KA, in his interview response, pointed out that:

> "The training institutes are very expensive in the country and charge up to $3000 for a short course in accounting or IT."

Information technology has particularly changed the way SMEs operate and conduct their business in the world and developing economies provide special training and awareness programs to benefit SMEs. In Saudi Arabia, such programs and vision are lacking on behalf of the government. The head of IT in KA understands:

"There is a lot of talk about the importance of IT in SMEs from the IT and commerce ministry in Saudi Arabia but fewer practical steps have been taken, especially investing in training and development of SME owners, whose role in accepting and implementing innovation is the most important.

The key decisions are taken by the owners and heads that are local and have less knowledge, and therefore act as a major hindrance in the adoption of e-procurement in selected Saudi Arabian SMEs. The head of IT in KA who is an expatriate, summed this up in the following words:

"Most of the SMEs' owners have no or very basic knowledge of ICT who takes key decision such as e-procurement adoption, we can only propose things to them but the final decision lie with them."

The deputy head of KA also pointed out some loopholes in the legislative framework to tackle online trading and stressed its importance in the adoption of e-procurement and other ICT solutions in SMEs:

"In the absence of a clear legislative framework, SMEs cannot even think about the adoption of e-procurement because they won't be able to resolve their issues and will further deepen the trust deficit which already exists in people's minds regarding online business."

The head of procurement in this firm responded to the importance of legislation for e-procurement as follows:

"Lack of clear e-trading laws is a great issue and a big barrier to the adoption of e-procurement in the kingdom. In the absence of such laws, conflict will arise that can't be resolved."

The head of IT in KA is very hopeful that the scenario is changing:

"The ministry of commerce and IT has recently taken some encouraging steps, which I think will facilitate some good developments in this regard and will promote e-commerce in the country in the next couple of years."

6.1.3 Case 3: Al-Maram

In relation to perceived e-procurement barriers, the analysis of quantitative data obtained via questionnaires from Al-Maram ranked the Gunasekaran and Ngai (2009) model factors. A new system, immaturity of technology, incompatibility with ERP systems, insufficient financial support, security concerns and cost of implementation) as follows (Table 8):

Table 8   Perceived Barriers to the Adoption of E-procurement in Al-Maram

Factors	Average	Rank	Consistency ratio (CR)
Lack of Knowledge and Skills	12.09%	3	
Lack of appropriate infrastructure	7.81%	6	
Top Management attitude	3.36%	12	
Lack of trust	7.21%	7	
Lack of Financial resources	15.53%	1	
Lack of interest or support from Government	13.57%	2	
Fear to change into a new system	3.81%	11	8.88%
Immaturity of Technology	6.19%	9	
Incompatibility with ERP Systems	4.31%	10	
Insufficient financial support	6.94%	8	
Security concerns	9.40%	5	
Cost of Implement	9.77%	4	

As can be confirmed from the figures in Table 8, lack of financial resources is the biggest barrier for the company's adoption of e-procurement, with a percentage priority of 15.53%, in contrast to KA and Saudi Suzuki, which are financially sound and strong. This is because the company is very small and has minimum financial resources. However, the government support and lack of infrastructure are ranked as the second and third most important barriers to the company's adoption of e-procurement, with an average percentage priority of 13.57% and 12.09% respectively. From the table, it is also evident that top management support is the least important barrier once the financial and infrastructural problems are overcome. The consistency ratio of 0.9 is relatively high but still within the acceptable range. This is again a positive sign that the management attitude is very positive regarding the use of technology in the SME and can be very helpful in the firm's future adoption of e-procurement. These results are complemented by the interview statements of the participants from the SMEs: for example, the head of the company, explaining its financial weaknesses, stated that:

> "Innovative ICT equipment is good but we do not have enough funding to invest in qualified IT staff and also to buy innovative ICT equipment. Skilled ICT staff are rare in the country and those available have high salary demands."

Explaining the role of the government and its impact on the company's adoption of innovative technologies, he said:

> "The government and other financial institutes' support is very low for SMEs like ours because they prefer to support more stable and bigger organizations, therefore we cannot afford to invest in innovative technology and skilled staff."

He also mentioned the lack of skilled human resources:

> "It is good to use innovative technology such as e-procurement in the firm but our staffs lack the knowledge and skills to run such a system."

He further stated that:

> "If the government is really interested in the development of e-trading, they must establish a legislative framework because it will not only protect the buyer and seller but will also help in promoting e-trading Activities in the country, which will have a positive impact on its economy."

6.1.4 Case 4: Al-Amazon

The analysis of quantitative data obtained via questionnaire from respondents in Al-Amazonin relation to perceived barriers on selected elements as shown in Table 9 below.

From these figures, it is evident that lack of infrastructure and government support, which are both external factors, are the highest ranked elements, with percentage priority of 15.58% and 14.17% respectively. The cost of implementation is another very important barrier for the company, with an average percentage priority of 12.70%, due to the lower size and lack of financial resources in the company. Similarly, lack of knowledge and skills is another very important internal barrier, which again can be related to the scarcity of skilled people in the market and their demand for high salaries. Fear of changing to a new system and top management support are ranked lower, as shown in Table 9: this is a positive and encouraging sign for the SME's future adoption of e-procurement. The CR of almost 0.9 is high but still within the acceptable consistency range.

Table 9   Perceived Barriers to E-Procurement Adoption in Al-Amazon

Factors	Average	Rank	Consistency ratio (CR)
Lack of Knowledge and Skills	12.25%	4	
Lack of appropriate infrastructure	8.17%	6	
Top Management attitude	3.05%	12	
Lack of trust	6.30%	7	
Lack of Financial resources	15.58%	1	
Lack of interest or support from Government	14.17%	2	8.95%
Fear to change into a new system	3.55%	11	
Immaturity of Technology	4.83%	9	
Incompatibility with ERP Systems	3.88%	10	
Insufficient financial support	5.75%	8	
Security concerns	9.80%	5	
Cost of Implement	12.70%	3	

The interview statements of participants from the SME further confirm the quantitative findings. For example, the head of Al-Amazon, in reference to the weaker IT infrastructure and internet in the country, stated that:

> "To be honest our ICT infrastructure is very weak, firstly we do not have enough funding to invest in qualified IT staff and also to buy innovative ICT equipment. Skilled ICT staffs are rare in the country and those available have high salary demands."

He also stated that:

> "We do not have qualified and skilled IT professionals to fulfil the e-procurement responsibilities."

Responding to the lack of financial resources, the head of Al-Amazon stated:

> "Honestly we do not have money to train our staff because the training institutes are very expensive and are also not up to the international standards in terms of training and education. We want government to invest more in SMEs in the form of training and development and by establishing cheaper or free training institutes, because SMEs play a key role in the economy."

He also understands that:

> "It is very hard for people to accept alterations to their work patterns and in this case there is job insecurity for those with less technical skills."

6.2 Cross-Case Analysis

The aim of cross-case analysis is to compare the findings from within-case analysis across all four selected SMEs and analyze the differences and similarities in the data obtained via quantitative as well as qualitative data-gathering techniques. The key objectives of cross-case analysis are:

- To compare and discuss the quantitative and qualitative findings across all four selected SMEs;
- To investigate similarities and differences in data obtained via quantitative and qualitative methodologies across all four selected SMEs using the Gunasekaran and Ngai (2009) model.

In relation to perceived barriers to e-procurement adoption in selected Saudi Arabian SMEs, the analysis of quantitative data obtained via questionnaires regarding twelve key elements (i.e., lack of knowledge and skills,

lack of appropriate infrastructure, top management attitude and lack of trust, lack of financial resources, lack of interest or support from Government, fear of change to a new system, immaturity of technology, incompatibility with ERP systems, insufficient financial support, security concerns, cost of implementation) is shown in Table 10, below. The table also shows the average priority ratio of each element within each of the four selected SME and the ranking of the elements as well as the average and overall consistency of the responses.

6.2.1 Quantitative Analysis

Table 10   Perceived Barriers to E-procurement Adoption — Quantitative Comparison Across All Four SMEs

Factors	case 1	case2	case3	case 4	Average	Rank
Lack of Knowledge and Skills	9.97%	9.57%	12.09%	12.25%	10.97%	3
Lack of appropriate infrastructure	16.90%	14.52%	7.81%	8.17%	11.85%	2
Top Management attitude	3.14%	3.55%	3.36%	3.05%	3.28%	12
Lack of trust	5.53%	8.12%	7.21%	6.30%	6.79%	8
Lack of Financial resources	3.60%	4.12%	15.53%	15.58%	9.71%	5
Lack of interest or support from Government	14.97%	15.47%	13.57%	14.17%	14.55%	1
Fear to change into a new system	6.65%	4.61%	3.81%	3.55%	4.66%	11
Immaturity of Technology	9.01%	10.26%	6.19%	4.83%	7.57%	7
Incompatibility with ERP Systems	8.47%	6.47%	4.31%	3.88%	5.78%	10
Insufficient financial support	4.84%	6.98%	6.94%	5.75%	6.13%	9
Security concerns	12.58%	11.03%	9.40%	9.80%	10.70%	4
Cost of Implement	4.36%	5.32%	9.77%	12.70%	8.04%	6
CR	8.34%	8.47%	8.88%	8.95%	8.66%	

From the figures above, it is evident that lack of infrastructure, lack of support from government and security concerns were the top three barriers in companies 1 and 2, with an average priority of 16.90%, 14.97% and 12.58% in company 1 and 14.52, 15.47% and 11.03% in company 2 respectively. All of these are barriers. Lack of top management support, lack of financial resources, cost to implement and fear of change were less important barriers in these companies, with an average priority of 3.14%, 3.60%,4.36% and 6.65% in company 1 and 3.55%, 4.12%, 5.32% and 4.61% in company 2 respectively, which shows that the SMEs' management support the change, have sufficient finances and are not afraid of change. However, it is understandable that the barriers are inhibiting their way of adopting e-procurement. Once these barriers are removed, there is better hope of e-procurement adoption in those two SMEs. In companies 3 and 4, however, the situation is different: lack of financial resources is the biggest barrier, followed by lack of government support and lack of knowledge and skills, with average priority of 15.53%, 13.57% and 12.09% in company 1 and 15.58%, 14.17% and 12.25% in company 2 respectively. Lack of financial resources is to be expected due to their smaller size and is further affected by lack of support from the government. Thus, they are impacted by theses barriers and are behind in the adoption of e-procurement and other such innovations. The data show that the selected Saudi Arabian SMEs are aware of the barriers to e-procurement adoption suggested in the Gunasekaran and Ngai (2009) model; however, they are aware of some more than others.

6.2.2 Qualitative Analysis

Table 11   Perceived Barriers — Qualitative Analysis

Perceive Barriers	Case1	Case2	Case3	Case4
Weaker ICT infrastructure	√	√	√	√
Lack of Government Support	√	√	√	√
Lack of IT skills and Knowledge	√	√	√	√
Absence e-procurement specific laws and regulations	√	√	√	√
Lack of trust in electronic transfer of funds	√	√	√	√
Lack of financial resources	x	x	√	√
Lack Top Management support	x	x	√	√

Qualitative data found seven perceived barriers of e-procurement in relation to selected Saudi Arabian SMEs, while elements such as fear of change to a new system, immaturity of technology, incompatibility with ERP systems and cost of implementation were not found either, due to less knowledge and experience of the procurement technology or because they were not important in the Saudi Arabian context. However, the former makes more sense, because they are important barriers that can be realized by people with adequate previous experience, but people in these SMEs lacked this practical experience of e-procurement adoption. Further, it is evident from the qualitative elements in the table that lack of top management support and lack of financial resources was not a problem in companies 1 and 2 but did affect companies 3 and 4, confirming the quantitative findings. Thus it can be deduced that barriers to e-procurement adoption were mostly realized but due to lack of knowledge and skills, awareness of technology and practical experience in e-procurement adoption among SME personnel, some of the barriers were not found in the qualitative data.

7. Discussion

Qualitative data analysis largely confirms the quantitative findings and further reveals that "absence of e-procurement specific laws and regulations" (BR13) and "lack of trust in the electronic transfer of funds" (BR14) were relevant and important for the adoption of e-procurement.
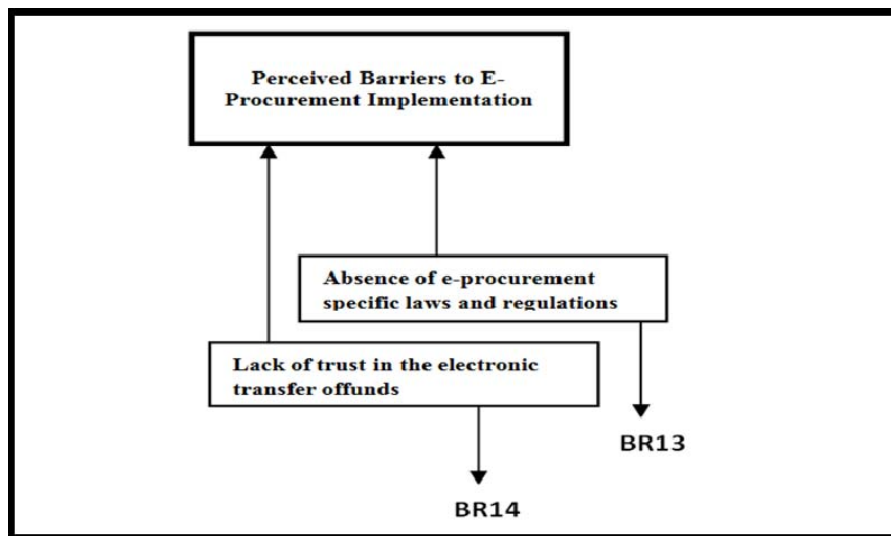

Figure 2   Perceived Barriers Elements of the Extended Model

7.1 Absence of E-Procurement Specific Laws and Regulations (BR13)

Analysis of data in chapter 6 reveals that the absence of procurement-specific laws is a key barrier that is not covered in Gunasekaran and Ngai's (2009) original model and that more than 80% of the respondents from Saudi Arabian SMEs highlighted it in their interview statements. The study therefore included it in its extended model. Details of interview evidence can be seen in appendix page. For example, as can be seen in the interview statement on page, the head of Saudi Suzuki believed that the country and its government have failed to develop a comprehensive conflictive resolution framework.

Absence of procurement-specific laws and regulations was another barrier found by this study which is extremely important for the uptake and adoption of e-procurement. Other studies in the e-procurement context complement these findings and emphasize the importance of a legislative framework in the successful adoption of e-procurement: for example, Teo et al. (2009), Engstrom et al. (2009) and Uyarra and Flanagan (2010) have found that lack of e-procurement-specific legislation is one of the biggest hurdles in SMEs' adoption of e-procurement in developing countries. Similarly, a study by Turban et al. (2015) further stresses that both buyers and suppliers need the elimination of fear in contract-related issues. He further states that e-procurement takes SMEs beyond the geographical location of their business and thus a standardized legislation, which is in line with international laws, is needed to overcome and solve conflicts smoothly.

7.2 Lack of Trust in the Electronic Transfer of Funds (BR14)

Further, the present study also revealed that another key barrier in the model is individuals' and businesses' lack of trust in electronic funds transfer. As can be seen from the interview statements of many study participants (70%) in appendix G, this is a key barrier. Further, the study also found that this barrier is deeply rooted and is a key cultural issue, as can be seen in the interview statements in appendix G and by Hofstede's cultural dimension of high uncertainty avoidance. One of the major reasoned mentioned by the interview participants, for example deputy head in KA and head of Saudi Suzoki stated that the newness of the online payment system and the fact that people are not fully aware and used to it. Head of Saudi Suzoki further stated that the even the banks themselves do not have complete trust in them yet. Thus, one can say that it will take some time for them to gain complete trust. The importance of trust in payment systems and weaknesses in this regard as a barrier has been widely discussed in the e-business and e-procurement literature.

Previous studies by Mercer (2005) reveal that trust in electronic funds transfer facilities and their security is key for the success and adoption of e-commerce in any country's SMEs. In a previous study in e-commerce, Mahmood (2013) found that people's lack of trust in e-payment in KSA is related to lack of awareness and lack of IT education as well as the culture of e-commerce in the country. Government and financial organizations must educate people and should tell them that electronic payment is very safe and secure. The study findings are also in line with a recent study by Olatokun and Kebonye (2010), who found that lack of trust in electronic funds, due either to infrastructural weaknesses, lack of awareness or reputation of the providers, is a key barrier for e-procurement adoption.

8. Conclusion

The study was to investigate and examine into barriers that affect   the adoption of e-procurement in four Saudi Arabian SMEs. In terms of barriers, the detailed quantitative and qualitative study confirmed that most of the factors mentioned in Gunasekaran and Ngai's (2009) study and the broader e-procurement literature were also

found in Saudi Arabia, albeit with some variations in priority. Weaker infrastructure and lack of government support were found to be the most important barriers. Similarly, study participants had high security concerns regarding online payment and transactions. Quantitative data further established that there was a lack of procurement specific laws and mistrust in electronic fund transferring mechanisms by the available options.

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